Final Evaluation Report

Your Details	
Full Name	Jessica Duran Antonio
Project Title	Effect of Grazing and Co-Occurrence Species on the Occupancy of Carnivore Mammals at the Mapimi Biosphere Reserve, Mexico
Application ID	24127-1
Grant Amount	£ 3753
Email Address	jessica.duran@posgrado.ecologia.edu.mx jess.durant@outlook.com
Date of this Report	2nd May 2020

1. Indicate the level of achievement of the project's original objectives and include any relevant comments on factors affecting this.

Objective	Not achieved	Partially achieved	Fully achieved	Comments
1. Estimate the occupancy of carnivore species as a function of habitat covariates.				Few records were obtained for this objective, which has made it difficult to analyse them, so field data processing is still underway for full compliance with the objective.
2. Estimate and model co-occurrence by pairs of carnivore species.				The patterns of coexistence between *Canis latrans* (coyote) and *Vulpes macrotis* (kit fox) were analysed. We found that both canids cohabited independently and both species were more likely to be detected in the same sites.
3. Determine the daily activity pattern of carnivores, their potential prey and livestock.				This goal was added after obtaining the RSG. The objective was completed by obtaining the daily activity patterns of five carnivore species, two wild herbivores and livestock.
4. To estimate the overlap of daily activity between carnivores, their potential prey and between predators and livestock.				This goal was added after obtaining the RSG. With the results obtained, we can suggest alternatives for managing livestock in the reserve, such as sheltering young individuals and females that are close to calving, as well as the times of greatest risk of predation on the herd.
5. Find out the degree of knowledge about carnivores that the inhabitants of the reserve have.				It was determined in general terms that few of the inhabitants have knowledge of the various species of carnivores that live in the reserve. This knowledge is strongly associated with the gender of the people (mostly men) and the relationship or participation that they have with researchers and/or universities that come to the reserve.
6. Estimating the social perception of carnivores.				It was found that the perception of the inhabitants towards carnivores is divided. That is, 50% of the population have a positive perception of carnivores and the other half a negative perception. This perception is associated with the age of the

				participants, the possession of livestock, and the influence that the administration of the reserve has had in each locality.
7. Dissemination of results and talks with local people.				Talks have been held with the population to make them aware of the results obtained so that they can be used by the community in their interrelations with the fauna studied. This implies planning other meetings with the inhabitants to continue disseminating the results, including the development of an environmental education project in this reserve, focused on the preservation of carnivores and their coexistence with humans and domestic animals.

2. Please explain any unforeseen difficulties that arose during the project and how these were tackled.

The use of the camera traps for the sampling presented difficulties with the batteries acquired initially since these were damaged by the high temperatures in the dry season; this setback was solved acquiring better quality batteries that could support high temperatures, which implied an economic impact since they are more expensive. Additionally, it was decided to place the traps in such a way that the vegetation itself would protect them from the solar radiation.

Gasoline costs increased so that it exceeded the budget for this item originally planned.

The rainy season extended into our sampling periods, making the trails impassable in some sections. On several occasions we had to ask for the support of the local people to be able to leave the reserve, as the vehicles were stuck.

3. Briefly describe the three most important outcomes of your project.

Three scientific articles and one of scientific disclosure have been written; of these, one scientific article and one of scientific disclosure have been published so far. While two remaining articles are in the process of publication:

1. "Co-occurrence of Vulpes macrotis and Canis latrans (Carnivora: Canidae) in the Mapimí Biosphere Reserve, Mexico." The aim of this study is to analyse the co-occurrence patterns of *Canis latrans* and *Vulpes macrotis* in the Mapimi Biosphere Reserve. The results of the two species models indicate that both canids occur independently, so spatial segregation is not fulfilled. On the contrary, both species were more likely to be detected in the same sites. It is possible that kit fox adopts surveillance and evasion of predation strategies at

a fine spatial scale, which together with the availability of prey allow it to coexist in low numbers at the same places as coyotes.

2. "Activity overlap of carnivores, their potential prey and temporal segregation with cattle in a Biosphere Reserve in the Chihuahua Desert." There was no temporal segregation among the carnivores. Carnivores synchronised their activity with their main prey, the black-tailed jackrabbit (*Lepus californicus*). In contrast, we did observe temporal segregation between the puma (*Puma concolor*), coyote (*Canis latrans*) and bobcat (*Lynx rufus*) with the mule deer (*Odocoileus hemionus*). There was little activity overlap between predators and cattle (*Bos taurus*, *Equs caballus*).

3. "Knowledge and social perception of carnivore mammals in a Biosphere Reserve in Mexico." With this work we seek to know the degree of knowledge about carnivorous mammals that the community living in a biosphere reserve in Mexico has, as well as their perception of them. In addition, we analysed the social aspects that could influence the degree of knowledge and perception of the community. In order to do this, we got involved with the population by increasing the relations with them, we carried out interviews and questionnaires. We found that most people knew few species of carnivores and their perception was divided, half had a negative perception and half a positive one. With these results, it is possible to make suggestions to the reserve's administrators, as well as to obtain points to be discussed in awareness actions for the inhabitants, in future projects.

4. Briefly describe the involvement of local communities and how they have benefitted from the project.

We began by introducing ourselves and having talks with the inhabitants who were previously working with the reserve or had interacted with researchers. In turn, these first contacts introduced us to other community members or gave us referrals from their homes to meet with them, for which we had to give the reference that we were coming from them. In this way, we got to know more and more people, particularly for the application of questionnaires, as well as to establish bases of relationship with the population, so that they would know who we were and the commitment we had to conservation in the reserve. So far, we have made two presentations at the council meetings with the inhabitants of the reserve and we plan to continue with the presentations, as well as the distribution of educational material at these meetings.

5. Are there any plans to continue this work?

Yes, we plan to expand camera trap sampling at different sites in the reserve since we have permission from the community to determine the distribution of the species in the protected area. Similarly, because we were able to detect some of the points that make conservation of the carnivores difficult, such as the negative perception of them and the general lack of knowledge of the species on the part of the community, we have thought of carrying out an environmental education project

focused on carnivores for the inhabitants of the reserve, which would include the local ranchers and the children of the local schools.

6. How do you plan to share the results of your work with others?

To share the results of the work, we have participated in national and international congresses, with the presentation of preliminary results. So far, one scientific article and one popular article have been published and work is underway to publish and write two more scientific articles. Likewise, we have participated in the reserve's council meetings, with presentations of partial results, and we plan to present a final report of our results at future meetings, as well as other educational and outreach materials for different audiences in the local community.

7. Timescale: Over what period was the grant used? How does this compare to the anticipated or actual length of the project?

The period originally planned for using RSG was April 2018 to December 2019. During this period, fieldwork, data analysis, and writing of scientific papers derived from the work were contemplated. However, the presentation of results and educational material with the community took more time than planned, due to the same organisation of meetings in the reserve and the spaces available for presentations.

8. Budget: Provide a breakdown of budgeted versus actual expenditure and the reasons for any differences. All figures should be in £ sterling, indicating the local exchange rate used. It is important that you retain the management accounts and all paid invoices relating to the project for at least 2 years as these may be required for inspection at our discretion.

Item	Budgeted Amount	Actual Amount	Difference	Comments
Gasoline for an ATV/ Transportation to the Mapimi Biosphere Reserve	1304	1904	+600	These two items were combined since transportation to the reserve was mainly by land and only sometimes by air, due to complications in getting from the airport to the reserve. Also, the increase in the cost of fuel exceeded the increase that we had predicted.
GPS Garmin Etrex 30 X	228	214	-14	The cost of the equipment decreased at the time of purchase.
Dormitory rent in the	351	100	-251	The cost of renting the

Mapimi Biosphere Reserve				dormitories in the Reserve was lower because we only stayed in the reserve during the placement and removal of the cameras and the taking of other data.
SD memory cards	326		-326	The purchase of SD memory did not take place, because we could not get 10 extra camera traps.
AA Batteries for camera traps and GPS	785	451	-334	We were able to reduce battery consumption by reusing batteries with sufficient charge for subsequent sampling.
Food	759	938	+179	Food was not financed by external sources because the resource was used for other items.
Didactic material		165	-165	Teaching materials were not originally a budget item. However, it was considered appropriate to allocate some of the RSG grant amount to this material for better dissemination of the results. This was also due to the concern of some people in the community to obtain printed material.
Total	**3753**	**3772**	**+19**	£1.00= 24.997MXN

9. Looking ahead, what do you feel are the important next steps?

1. Know the distribution, density and movement of carnivores by monitoring with camera traps and telemetry on a larger scale, covering the entire reserve and involving the local community.

2. Identify the sites most susceptible to conflict with carnivores due to cattle predation with the help of point number one, as well as increasing the application of questionnaires in order to reach more people and cover the remaining localities with influence over the reserve.

3. Increase alliances with the reserve's administration and NGOs to carry out environmental education and awareness projects focused on predators for the different audiences of the local population.

10. Did you use The Rufford Foundation logo in any materials produced in relation to this project? Did the Foundation receive any publicity during the course of your work?

Yes, the logo of the RF was used in all materials for the dissemination of the work, including presentations and posters at congresses, institutional seminars, presentations with the community and educational materials. Likewise, in all the publications we wrote, we included our thanks to RF for the grant.

11. Please provide a full list of all the members of your team and briefly what was their role in the project.

Dr. Alberto González-Romero: is the thesis advisor of the present project. His participation was essential due to his knowledge and contacts in the area of study, as well as during the writing of the scientific articles.

Dr. Vinicio Sosa-Fernández: He is one of the co- advisors of the thesis, collaborating in the sampling design, data analysis and interpretation of results throughout the project.

Dr. Enrique Martínez-Meyer: He collaborated as advisor and reviewer of the thesis.

M. sc. Rodolfo Cervantes-Huerta: He supported us during the field work by installing camera traps and with the elaboration, application and interpretation of the questionnaires to the local community.

Mr. Gabriel Andrade-Ponce: Assisted in field work and writing scientific and disclosure articles for the dissemination of the results.

12. Any other comments?

We are deeply grateful to RF for the funding of this project, since with this support an important advance was made in the search for a practical solution for both the inhabitants and the fauna of the estuary. We are satisfied with the work done. We were able to meet many people who live in this reserve and it was very gratifying to be able to share our mutual experiences about carnivores, since this is a group that has been little studied in this region. We are anxious to continue our participation for the conservation of these animals, in coexistence with the human activities and we hope to count again with the support of RF in the future.

During the application of questionnaires to the inhabitants of the Mapimí Biosphere Reserve.


Reconoce a tus
carnívoros


Orden: Carnivora

Talks and presentation of results to the local community and administrators of the Mapimí Biosphere Reserve during a council meeting of the reserve.